

with the authors Compliments

12

SYDNEY PRICE JAMES

1870—1946





P. P. James.

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SYDNEY PRICE JAMES was born at Highgate on 17 September 1870, the youngest of three sons and a daughter of Thomas Edward James and Margaret née Price, eldest daughter of seven of Rev. George Price, a successful preacher and lecturer. His father, who came from a Hereford family, was keenly interested in outdoor sports and a wide reader of books on discovery, biography, travel and adventure. He interested his children in collecting birds' eggs and insects and he gave James his first microscope. James's eldest brother for whom he had a great affection, after retiring as a surgeon in the Navy and going out to South Africa, died of malaria and blackwater fever in 1900. His second brother became a successful farmer in Rhodesia creating his own farm. This brother was a keen amateur photographer and invented and patented Velox paper.

When he was about five years old James's parents moved to Carmarthen where most of his boyhood was spent. He was at this time very fond of boating in the pleasant surroundings of the Towy estuary and also used to go yachting with an uncle at Cowes, which probably was the cause in later life of his taking to yachting as a recreation at Bosham, a little yachting centre on the Sussex coast near Chichester and eventually to his retiring there to live. At the age of fourteen his parents returned to London where James attended St Olave's School, Southwark, passing his matriculation first class at sixteen. His original intention was to join the Forest Service, but circumstances eventually led to his taking up medicine. He spent three months at Guy's, but having obtained a scholarship for St Mary's Hospital he completed his medical education at that hospital, passing out in 1895 with the M.R.C.S. and L.R.C.P. and M.B., B.S. London. Later he took the M.D. London and the D.P.H.

In 1896 James joined the Indian Medical Service and was at Netley from March to July of that year. He sailed for India in October. On arrival at Bombay he was attached as Junior Medical Officer to the 3rd Madras Lancers. In June 1897 he was despatched on plague duty to Waziristan and after some weeks there received orders to join the N.W. Frontier Force in the Tochi Valley Expedition. Here he contracted typhoid and was sent home on sick leave in November of that year. Whilst at home in the following September 1898 he married Lisa Marles, daughter of the Rev. W. Thomas of Llynrhydown, Cardiganshire, a well-known Unitarian Minister whose bardic name and that under which he wrote was Gwilm Marles. James and his future wife had been playmates at Carmarthen and later when he was a medical student and she studying music and dramatic art at the Royal College of Music a close friendship arose which resulted a few years later in a very happy marriage.

Returning to India in October with his wife, James was posted to the Military Hospital, Secunderabad, and after a few weeks to Quilon, Travancore, as M.O. with the 19th Madras Infantry, Sir Ronald Ross's old regiment. It was here at Quilon that he began to take an interest in mosquitoes and where he was so soon to show that enthusiasm and capacity for research which later gained him such distinction. Travancore is in the extreme south of India where filariasis and its consequence elephantiasis are extremely common. It is natural therefore that he should have studied this disease. What is of interest is that he, out of many who must have been in a position to do so, should have turned his attention to following up Manson's work on the development of the filaria in the mosquito and as a consequence should have been able to announce only a few weeks after Low and quite independently how the disease was transmitted. It is difficult now when facts about mosquitoes are so generally known to realize how rudimentary was knowledge about them at this time. In fact the rearing and maintaining of mosquitoes alive sufficiently long to obtain development was one of the chief difficulties with which Manson and the early observers had to contend. It was known as a result of Manson's work that development of the filarial embryo took place in the mosquito, but the method by which man became infected had not been ascertained, though it was supposed that on death of the mosquito the developed embryo, or larva, as the mature form is generally termed, gained access to water and from thence was imbibed by man. Low working at the London School of Tropical Medicine with preserved material sent to him by Bancroft from Australia described in the number for 16 June 1900 of the *British Medical Journal* the finding of larval forms in the proboscis of these mosquitoes (then identified as *Culex ciliaris*) and considered that infection to man was conveyed not by water but by bite. Four weeks later in the number for 17 July in the same journal was an editorial note saying that Capt. C. P. (correctly S. P.) James stationed at Quilon, Travancore, had lately made observations pointing to the same conclusion and that working with fresh anopheles and culex mosquitoes in complete ignorance of Dr Low's results had found the developed embryos in the head and proboscis of his infected mosquitoes and had independently arrived at the conclusion that the filaria is communicated by mosquito bite. In the issue for 1 September 1900 a paper from Capt. James read at the August meeting of the British Medical Association at Ipswich was published giving full details and drawings illustrating these observations. In this paper it was noted that the mosquitoes in which development had been found to take place were identified by Dr Giles at the British Museum as *Culex microannulatus* (now *C. sitiens*) and *Culex albopictus* (now *Aedes albopictus*) and that development also occurred in *Anopheles rossi* and in another species of this genus. Unfortunately lack of priority in publication by these few weeks, due to his being in India and to the time taken in transmission of his results by mail, has led to James receiving less recognition for his independent and simultaneous discovery of an important fact in tropical medicine than he would otherwise have had. The fact that a further species of *Culex*, a species of *Aedes* and two species of *Anopheles* could act as vectors was no small further addition to knowledge at this time.

But these were not the only important observations made whilst at Quilon by this young officer so fully alive to what was being then done in medical research in the tropics, for within a year of the announcement of Ross's results showing that malaria was conveyed by a peculiar type of mosquito, his dapple-winged mosquito, James was publishing important information about this mosquito, regarding which at that time practically nothing was known, and was thus one of the earliest pioneers in the building up of the new epidemiology of malaria. At this time anopheles were supposed to breed only in small puddles of the type described by Ross. James, however, showed (*Brit. Med. Jour.*, 9 Dec. 1899) that they not only bred in pools, but in rice-fields, in water lying in furrows on cultivated ground, in large surface sheets of water and in other forms of breeding place. He was the first to point out (for few at this time had actual experience of these mosquitoes in nature) that the destruction of mosquitoes was likely to be a much more difficult task than was then being thought, a view only too evidently confirmed by later experience in the carrying out of such work. James, too, was among the earliest to describe some of the larvae of common tropical mosquitoes and to draw attention to their differences. His 'tiger mosquito' was that later known as *Stegomyia fasciata*, a species which has appeared under a bewildering number of aliases until it has now respectably settled down as *Aedes aegypti*, the yellow fever mosquito. All such knowledge about mosquitoes in those days was very vague and elementary. The *Culex ciliaris*, in which it was noted that mature embryos of filaria had been found in the proboscis by Low, seems to have been the now well-known *Culex fatigans*, for Giles gives it as a synonym of *Culex pipiens* which is not known from Australia, but for which *C. fatigans*, very common in Australia, could easily be mistaken in those days.

In August 1900, at the time of the Boxer Rebellion in China, James received orders to join the China Expeditionary Force Hospital at Coonoor, where he found that his senior officer when with the 3rd Madras Lancers, Col. Armstrong, was in command, his wife returning to England where their eldest daughter Audrey was born. The hospital spent the winter in camp at Shan-hai-Kwan on the coast (Lat. 40° N.). Here James continued to make observations on mosquitoes and forwarded specimens of the species later known as *A. maculatus* to Theobald (*Mono. Cul.*, I, p. 173) with notes on its breeding places. He afterwards took part in the relief of Peking. In June 1901 he was recalled to India to be placed on special duty with the Malaria Commission of the Royal Society and Colonial Office. This Commission, formed at the instigation of Sir Joseph Chamberlain in 1898, was composed of three members, Dr (later Professor) Stephens and the writer appointed by the Royal Society, and Dr C. W. Daniels representing the Colonial Office. It had already spent some two years in Central and West Africa and was then, with the exception of Dr Daniels, about to visit India. James joined the other two members early in 1901 in Calcutta and with them carried out important researches on malaria in Calcutta and some other areas in the north-east of India. In particular these observations recorded for the first time the selective breeding habits of different species of anopheles, the

foundation of species sanitation, and determined by the parasite rate and spleen rate the measured endemicity of malaria in different localities.

Apart, however, from its general programme of research the Commission was desirous of initiating an experimental trial of the method of combating malaria by the destruction of the breeding places of anopheles. It was thought that this could best be done in some selected military cantonment and, after consultation with the authorities and visits paid to a number of likely cantonments, Mian Mir (now Lahore Cantonment) was chosen. The requirements were that the cantonment selected should be highly malarious and at the same time should not offer such natural obstacles to success as would be likely to make the operations difficult. Mian Mir seemed admirably suited in both respects. In September 1901, James having met his wife and child at Bombay and Dr Stephens, then newly married, being joined by his wife from Naini Tal, the Commission assembled at Lahore with the object of making a thorough study of the conditions as they existed in the fever season, which was known to be mainly from August to November. This initial survey, so essential to any critical experiment of the kind, was duly carried out. But with the onset of the cold weather in November anopheles practically disappeared and the Commission took advantage of this to attend the Malaria Conference held at Nagpur in January 1902. This Conference, which owed its inception to Major Andrew Buchanan, I.M.S., then in charge of the Central Jail, Nagpur, was a unique meeting which, attended by most of those then working on malaria in India, formed an undoubted landmark in malaria research in India. It was here that, under exceptionally favourable conditions, the Commission determined the infectivity of a considerable number of Indian species of anopheles under experimental conditions as well as the habitual limits of anopheles flight, an estimate then made which later experience has amply confirmed. It was at this conference also that James formed the association with Liston which led to the publication in 1904 of the first edition of their classic *The anopheline mosquitoes of India*. Following the conference and some weeks spent at Nagpur, and whilst the other two members of the Commission visited the Jeypore Hill Tract, where blackwater fever had been reported, James and Mrs James visited Madras, where James made some important observations at the one time holiday resort, Ennur, a few miles out of Madras, then becoming highly malarious. It was at this village that the fact that two species of anopheles might behave in an entirely different fashion as vectors of malaria was first firmly established, the abundant species *A. rossi* being shown to be playing little or no part, whilst the real culprit was the much less common and inconspicuous vector species *A. culicifacies*.

In April the Commission returned to Lahore. Unfortunately Dr Stephens who had been suffering for some time from dysentery left for England. Other circumstances led later in the year to the return of Dr Christophers. For the first year of the operations therefore their conduct fell to James, who has given a very full account published as one of the *Reports to the Malaria Committee of the Royal Society*. The results, as also those obtained later by Christophers in

1903, showed that control of malaria by anti-larval operations was far from being an easy and simple matter, that to be successful over an area such as that of a cantonment measures required to be of considerable magnitude and that above all it required thoroughly organized action combined with a high degree of supervision. James has always held such views very strongly and later work has amply justified his critical attitude. It is only the development in comparatively recent years of paris green, DDT and other larvicides and other powerful aids arising from research and experience that have made such measures at the present time hopeful of success. James continued the operations at Mian Mir until the autumn of 1903 when the work was taken over by the writer, who had then joined the Service.

James was now recalled to Simla and was shortly appointed Statistical Officer with the Government of India, a post that was virtually Assistant Sanitary Commissioner. It was just about this time and before he had left Lahore that an incident occurred that might have had tragic results and which perhaps will serve to remind the reader that life in India was apt to have more variety than, at that time at least, was usual in more restful conditions at home. It then being the hot weather Mrs James and the two children, Audrey and Delia, the latter being only a few weeks old, were living at the hill station of Kasauli in a bungalow situated on a spur above a precipice (a not unusual site in north Indian hill stations) when the whole roof of the bungalow was blown off in a storm and was heard crashing down the precipice below. Fortunately no one was hurt.

The Sanitary Commissioner at the time of James's recall was Major J. W. T. Leslie, an administrator of great ability to whom was due the formation of the present Bacteriological (now Medical Research) Department in India with the Central and different Provincial Laboratories on which the scheme is based. Major Leslie was at heart a scientist and highly sympathetic to sound scientific work. There is little doubt that during the years that James worked with Leslie he must have profited greatly in respect to administrative experience and knowledge of public health and research matters.

In December 1905 James came home on leave, Mrs James and the children having preceded him in April of that year. Whilst on leave he obtained in 1906 his M.D.(London), with his subject tropical medicine. He also at this time attended the courses for, and took, his D.P.H.(London). In October he sailed for India to take up again his appointment, his wife and children rejoining him at Simla in the autumn of 1907. Here in what must have seemed looking back a happy and peaceful interlude the family lived until November 1910, at one time in a bungalow high up on Jacko, the 8000-foot deodar and pine-covered mountain on the flanks of which Simla is built, at another time in a bungalow on the picturesque spur known as Elysium overlooking the distant snows, and in the summer months out on the Mahasu Ridge near Wildflower Hall, a delightful sylvan retreat. Here at Simla in that curious mixture of restful surroundings and lovely scenery, with the stress of official life and social duties which characterize this centre of human activity in the Himalayan foothills,

James never ceased to work hard, though taking his due part in social affairs. Apart from official comments and statements in Government reports, such as those in the Annual Statistical Reports of the Sanitary Commissioner with the Government of India, James at this time wrote his *Causation and prevention of malarial fevers*, a work summarizing recent advances in connexion with malaria intended for the information of Sub-Assistant Surgeons and Civil Assistant Surgeons, a third edition of which was published by the Sanitary Commissioner's Office in 1908. He also wrote an account of vaccination in India in his book *Smallpox and vaccination in British India*, perhaps the first of his writings where the pleasing simplicity of his style was clearly manifested. At this time too he published one or two papers in the *Scientific Memoir Series*. But apart from this, and with constant and steady interest, James continued to work on Indian anopheles and in 1911 the second edition of James and Liston's book with the beautiful and accurate plates by Turkhud was published. Probably few works have done more to encourage and afford help and guidance to those working on malaria in India and the East than this now classical volume which still has its interest though much that is new since then has made it no longer the complete repository of knowledge on the subject it then was.

Big changes were, however, coming about and with two of these, especially towards the end of his time, James as Statistical Officer had much to do. The first was the establishment of an All-India Malaria Organization following on the Imperial Malaria Conference held at Simla in 1909, the second the formation of the Indian Research Fund Association, an organization similar in its general scope and functions to the Medical Research Council of this country.

The permanent organization for the investigation of malaria in India then set up consisted of a Central Committee with its research centre, the Malaria Bureau of Kasauli, and the Provincial Malaria Organizations, the activities of which in the next few years by means of surveys and investigations had ascertained for the first time the distribution and other features of malaria in India viewed from the modern standpoint. James took a very active part in the creation of these organizations, and besides being Secretary of the Central Committee was originator and editor of *Paludism*, the journal of the organization intended to be a permanent record of and stimulus to malaria work in India. It was unfortunate that owing to the 1914–1918 war the recall of many senior malaria officers to military service and other changes led to break up of what might almost be termed the golden age of malaria research in India when senior highly trained officers like Liston, Graham, Bentley, Christophers, Kenrick, Fry and others added greatly to knowledge of malaria conditions in that country.

The Indian Research Fund Association was instituted in 1911. It consisted of a Governing Body with the Minister for Public Health as President, a Scientific Advisory Committee and an Annual Conference of Research Workers attended by research workers from the Provinces and research institutions from all parts of India. Though James was associated only with the beginnings of this all-important body which now is mainly responsible for medical research work in India he played a large part in its creation.

James, however, was not fated to remain indefinitely an administrative officer at Simla. With the opening of the Panama Canal in 1910 a very serious view began to be taken of the possibility of the introduction of yellow fever into India by the shortening of trade communications with the endemic areas of this disease and James in October 1911 was placed on deputation by the Government of India to visit the endemic area and various ports likely to be concerned and to draw up proposals for the protection of India against possible introduction of the disease. In the period January to May 1912 James visited Singapore, Hong Kong, Shanghai, Tokyo and other ports in Japan, Honolulu, Guayaquil, New Orleans and the Panama Canal Zone. In his report he showed that fears then entertained of the direct introduction of yellow fever into India were not justified and that before this could happen the Far Eastern ports, such as Hong Kong, would first have to become infected and act as dissemination centres. He pointed out, however, that India should have some means of ascertaining the facts relative to any spread of this disease, means that did not then exist, and that the same applied to an even greater extent to the Far Eastern ports. The experience gained by James in this investigation and the soundness of his recommendations gave him some years later a very strong position when the introduction of air routes had made international action in respect to yellow fever urgent. He became not only a member of the Permanent Committee on Yellow Fever of the Office International d'Hygiene Publique, but President of the Yellow Fever Commission of that organization, a position which he held for many years.

To return; however, to the somewhat strenuous times of the world tour: James reached England in May 1911, and in October of that year with his wife sailed for India. He was not, however, to return to Simla, for at Port Said he received a telegram directing him to visit from the point of view of yellow fever the Burmese and Indian ports and thence to proceed to Ceylon, since the Ceylon Government had put in a request that his services might be lent to undertake a mosquito survey of Colombo and to initiate measures to render this harbour safe from the point of view of yellow fever. It was therefore not until the end of January 1912, after crossing from Burma, that James and Mrs James reached Colombo with the prospect of spending some considerable time in Ceylon. It is characteristic of James that in the writer's experience he was never heard to complain of what many might well have considered undue hardship. The results of a year's work at Colombo have been embodied in several reports published by the Ceylon Government and were summarized in papers by James in the *Indian Journal of Medical Research* (1914, 2, pp. 227-267) and, later, in a paper read at the Royal Society of Tropical Medicine and Hygiene in July 1914. This, however, is to anticipate, for in November 1913 James was taken dangerously ill, necessitating an abdominal operation, and after an attempt to carry on was in January sent home on sick leave.

Recuperating in the country among the restful Welsh hills and later in London James regained his health and old vigour. But in August with six months of his leave still to go the 1914-1918 war had broken out and with other I.M.S. officers

on leave he was recalled to India and there mobilized for the Kitchener Indian Hospital. This hospital was eventually established in 1915 at Brighton in the old workhouse on the Downs and James as Registrar worked hard at its organization and establishment. But in January 1916 he was selected by the Secretary of State for India (Sir Austen Chamberlain) to reorganize the sanitary services in Mesopotamia then giving rise to much anxiety, and sailed for that country with the status of A.D.M.S. San. There followed a time of strange experiences. A Central Laboratory was set up first in the vacated Naquib's Palace at Busra, later moved to a central position on the hulk *Elphinstone* moored in the Tigris. Urgent voyages were made up-river in the great P boats that in peace-time had plied on the broad rivers of the Ganges delta and Brahmaputra, and generally in heat and discomfort James worked strenuously to carry out his task, for success in which he received mention in dispatches. But on one tour up-country in August he contracted cholera and was invalided to England.

It might have seemed at this time that James's career was at an end. Actually it was from now on that he chiefly gained his reputation as an authority on tropical diseases and especially as perhaps the most outstanding malariologist of his day. James was invalided from Mesopotamia (now Irak) at the end of 1916. He was therefore in England for the last two years of the war and was brought into contact with the very serious issues connected with malaria in troops returning home infected and with the not infrequent local outbreaks of malaria in this country. He took a prominent part in the investigations then being carried out and was soon recognized as an authority in all such matters. In 1918 he was appointed Medical Inspector and Adviser on Tropical Diseases to the Local Government Board, now the Ministry of Health. In the same year he retired from the Indian Medical Service.

In the eighteen years that he held his appointment on the Ministry, James, very naturally, largely became the administrator. But as seldom happens he maintained such close personal contact with research that he was better known for his results in this field than as an official. He worked during these years indefatigably and infused into what might have been routine administration creative ability and progressive originality, organizing in connexion with his office a Tropical Diseases Reference Library, and entering enthusiastically into the activities of the Health Section of the League of Nations and of the Office International d'Hygiene Publique. Above all, however, he developed and inspired malaria research carried out in this country. In 1918 he read a paper before the Royal Society of Tropical Medicine and Hygiene entitled 'Malaria contracted in England' embodying the results of recent investigations and giving this subject an interest it had not before had. In 1920 his 'Malaria at home and abroad' was published. On many occasions he exhibited at the meetings of the above-mentioned Society specimens of interest in relation to malaria, such as the eggs of British mosquitoes, slides of unusual malaria parasites, always infusing a sense of freshness into the subjects touched upon. But it was his creation under the Ministry of Health of the Malaria Therapy Centre at Horton and the results that emanated therefrom which above all brought James fame and

reputation. During the 1914–1918 war the question of treating general paralysis by the new therapeutic use of induced malaria had become very acute. Arrangements for such treatment were very inadequate and entirely restricted to induction by blood inoculation, a method which has obvious undesirable possibilities and is less effective than induction in the natural way by the bite of infected mosquitoes. James (and here probably his Indian experience prompted such action, for the Indian investigator of disease in the field knows no formality) himself personally explored the possibilities at a number of mental hospitals in the London area and found in the Horton Hospital near Epsom what he required. As a result an arrangement was made by the Ministry of Health in consultation with the Board of Control, the London County Council and the authorities of the Horton Mental Hospital for the start of a centre for malaria therapy. In this small extemporized beginning the technique necessary for the induction of malaria in the treatment of general paralysis and certain other nervous diseases through the bite of infected mosquitoes was built up and perfected so that at the present time infected anopheles are supplied on request to all parts of England and Wales. Not only so, but by a happy inspiration of its originator, the Centre has been made a means of carrying out scientific investigations upon malaria and its transmitting agent the anopheles mosquito which have very greatly extended our knowledge of the disease and especially of its treatment and prevention by drugs. In 1924 James read before the Royal Society of Tropical Medicine and Hygiene a paper entitled 'Epidemiological results of a laboratory study of malaria in England' which was recognized in the discussion following it as one of the most important contributions made to the epidemiology of malaria for some time and in which a quite new type of observation was brought forward. In the Horton Centre James was fortunate in having secured the services of Mr P. G. Shute, whose contributions to malariology have made his name familiar to malariologists of many countries and to whose unflagging enthusiasm and sound common sense the Horton Centre owes much of its success, and also in the happy association with Dr W. D. Nicol, Superintendent of the Horton Hospital and joint author with James, Shute and others in many contributions to the literature. Space does not permit of a detailed account of the work of the Horton Centre with which up to the time of his death James was intimately associated. But it may be said in brief that it was the first official centre in any country for the treatment of general paralysis by induced malaria and that it has rightly gained a world-wide reputation as a unique and vital centre of malaria research. Here the clinical aspects of the disease according to modern conceptions, the behaviour of strains, the periodicity of relapses, the action of quinine, atebrin and various synthetic drugs, knowledge regarding sporozoites, the establishment of *P. ovale* as a valid species and much else has been almost uniquely investigated. Certainly, before needs of the recent war had led to intensive and widespread research on the action of atebrin and other drugs by the military and other authorities in this country and America, the chief source of our knowledge regarding both clinical malaria and its treatment has been the Horton Laboratory.

No reference to James's work would, however, be complete without some account of the part he played in the activities of the Malaria Commission of the League of Nations. The Commission was initiated in 1923 as a result of a proposal presented to the Health Committee of the League arising out of a request from several countries to that body for advice regarding malaria. A small malaria sub-committee was first appointed and later expanded to form the Malaria Commission. This in 1924 undertook collective enquiry into malaria in Europe and elsewhere, seventeen members from eleven countries taking part. Palestine and Asia Minor, and later Spain and Sicily were visited in 1925. Later the Commission or some of its members visited Russia, Roumania, Poland, the United States, British India and other countries. Large-scale experiments on the effect of drug prophylaxis in different populations were arranged for and reported upon in statistical form. In four general reports knowledge regarding curative and prophylactic use of quinine and synthetic drugs was brought together and innumerable other studies upon various aspects of malaria dealt with in a special series of League publications. James throughout played a large part in all this work. He was one of the most active members of the Commission and was in 1934 elected Vice-President, at the same time being awarded the Darling Laureate and Prize for his outstanding contributions to malariology. During his time with the League he made many friends among famous malariologists of many nationalities, as well as among those prominent in public health and scientific work in this and other countries. By all he was greatly esteemed and honoured and on his death his widow received many letters from famous foreign workers expressing their regrets and condolence.

In 1927 James was appointed a member of the Fletcher Committee on the organization of medical research in India and in 1929 at the request of the Colonial Office he visited East Africa and advised upon malaria in that country.

In 1936 he retired from the Ministry. Up to this time he had been living in London with his family, with occasional brief holidays at Bosham, where he had a small house at the water's edge and where he renewed his old liking for yachting, entering into this recreation with much enthusiasm until later his health necessitated curtailment of such pursuits. On retirement he went to live in Cambridge in pursuance of a desire he had long had to devote his time wholly to research. Early in 1937 he was working in Professor Keilin's laboratory at the Molteno Institute, having taken up an enquiry with a grant from the Medical Research Council and the Rockefeller Institute for work on a new blood parasite in chickens transmitted by *Aedes aegypti*, which Professor Brumpt had recently brought from Ceylon, now the widely known *Plasmodium gallinaceum*. He was literally thrilled at once more spending his day with the microscope. Before long he saw the unpigmented, so-called exo-erythrocytic forms of the parasite which have since made this parasite a subject of work by many observers. In a paper with Tate he gave a clear description of these forms, one of the earliest publications dealing with this hitherto unknown phase in the life history of *Plasmodium*.

That some at least of the plasmodial parasites of red cells had, besides the ordinary schizogonous cycle in these cells, a second schizogony stage in tissue

cells of the organs was something quite unexpected and the question at once arose whether such a stage existed in the human malaria parasites and whether it explained the existence of the characteristic relapses of malaria. Further, was it the reason that drugs might be ineffective, as was quinine, in preventing onset of the disease when given in the incubation period, the parasite at this time being in the exo-erythrocytic stage and so invulnerable to drugs like quinine whose action was essentially that against parasites in the red cell? James's health, however, necessitated his giving up this work and shortly after outbreak of the war he left Cambridge for Bosham. Nevertheless his active interest in malaria and especially in questions connected with treatment and prophylaxis of this disease and the urgency of such questions in relation to our troops engaged abroad in malarious countries caused him again to enter the arena. Not only was he an active member of many war committees dealing with different medical issues, but he himself in the hospital at Chichester undertook so far as he was able research on points connected with malaria treatment that he thought especially important. Whilst living at Bosham and making frequent visits to London he had a heart attack for which he was admitted to Chichester Hospital where he died peacefully on 17 April 1946 leaving a widow and two daughters.

James received the Fellowship of the Royal Society in 1931, the Prix Darling Laureate of the League of Nations in 1934, the C.M.G. in 1935. He was President of the Yellow Fever Commission of the Office Internationale d'Hygiene Publique from 1930 onwards and President of the Royal Society of Tropical Medicine and Hygiene 1937-1939. He was universally recognized as one who had added greatly to modern knowledge of malaria in many directions but pre-eminently in treatment and prophylaxis of this disease.

Whilst what has been said indicates the subjects with which James concerned himself at various times in his life there can be no doubt that two of these were most deeply entrenched in his heart, viz., his early work on the anopheline mosquitoes of India and the researches carried out later at Horton. It is this last which brought him most fame and which must be considered his greatest work. Gradually at this centre of research, to which he literally gave birth and nurtured, results became co-ordinated and linked up until what almost became a general theory of malarial infection resulted. To James, especially latterly, the coping stone of this work would be a drug which would cure malaria, not merely temporarily cure the attack. Later came the idea of 'causal prophylaxis' of which he may rightly be said to be the sole originator, the idea that a real preventive would be one in which the parasite was killed before causing infection, i.e., as the sporozoite, or at least in the early exo-erythrocytic stage, should such a stage occur in human malaria. With his work at Cambridge there came not only the major discovery of the existence of an exo-erythrocytic stage, in itself a gratifying result towards the end of a long life of research, but a possible explanation of the intractable character of *vivax* infection, now recognized to be the most outstanding problem in the treatment of malaria, and it was as such that the discovery appealed most deeply to James. Shortly before his death he

was instrumental in bringing about an enquiry under the Royal Society to ascertain whether such a stage could be demonstrated in plasmodial infections of monkeys and if so provide a further reason for its probable existence in human malaria.

As a scientist James's most notable characteristics were intensity and an originality of thought which went beyond what was ordinary and an absorption in his subject which caused him never to spare himself in its prosecution. These same qualities were also evident in the ordinary affairs of life. Thus to be more efficient in his League of Nations work he took late in life to an intensive study of French so that he became a fluent speaker in that language. Whatever he thought ought to be done he carried through with indomitable will. He once said to the writer regarding some drawings for reproduction involving very laborious dotting that if he once knew what would give the effect he did not mind how laborious it might be to carry out. He was apt to be deeply affected by examples in history of a famous character achieving results by some special technique. Thus in his early days he was impressed by the letters of Junius and there was at times a touch of this in his sometimes very caustic writings and speech. There was no doubt too that he had the attribute of the administrator where it mattered little who did the work if the result was achieved, perhaps a little unusual in the scientific investigator. He was, however, no office recluse and a certain gay and mercurial enjoyment of the lighter side of life was quite one of his characteristics. As in his work so in his private life there was an originality and unexpectedness in what he said and did and even at times a certain puck-like diablerie which he was apt to exhibit. It is said of him that at his time in Simla when Mrs James was playing an active part in the musical and theatrical world of Simla and its well-known amateur dramatic club, James volunteered to fill the vacancy of an actor required to dance a hornpipe. He went to great pains to equip himself for the part and made a sensational debut and success. He was kindly and thoughtful of others and quick to see another's point of view. He was simple in his tastes, a very early riser even in this country and with a liking to do his own simple tasks. In manner he was said by one writer of an obituary notice shortly after his death to be more like the cavalry officer than the savant and this was very true. He was modest—one would not have expected anything else from one of his calibre—but not so much from diffidence as that he was so concerned with his subject that he never thought of himself. He was a staunch friend and never spared himself to meet the calls of friendship however onerous. He was an excellent speaker with a happy knack of taking his audience with him and he was sometimes referred to as the man with the silver voice. As a writer he had a style which charmed by the apparent simplicity of expression, clear and free from all ambiguity. As chairman or president at meetings he had an easy manner which put others at ease and in his office and laboratory his assistants were devoted to him. He had many friends in this and other countries and his loss has been deeply felt not only as a great malariologist but as a much admired and liked personality.

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